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Serving the Underserved: The Role of CT Scans in Lung Cancer Screening

Dr. Sands:

Lung-screening CT scans have the potential to dramatically improve lung cancer outcomes by substantially increasing the number of people that get diagnosed while still early-stage. But screening has not yet been widely adopted. Are we missing the mark when it comes to access to CT scans within underserved populations? Welcome to *Project Oncology* on ReachMD. I'm Dr. Jacob Sands, and here to share his research presented at ASCO on a pilot study using a mobile CT scanner is Dr. Derek Raghavan, president of Atrium Health Levine Cancer Institute, in Charlotte, North Carolina. Dr. Raghavan, I've been looking forward to this program. Welcome.

Dr. Raghavan:

Thank you so much. It's a delight to be talking to you Jake.

Dr. Sands:

let's start out with just the data on lung screening in general and understanding the impact. What has the data shown about lung screening?

Dr. Raghavan:

You know, I think the data are absolutely convincing to me. I think there've been several randomized trials, two that I think are the most important. One run in the USA by the National Lung Screening Trial group. There are about seven or eight different, well-known pulmonologists and radiologists involved in the group, and they basically reported in the *New England Journal* a comparison between using low-dose CAT scanning versus chest X-rays to look for the ability to find early-stage lung cancers. The idea of screening, as I know you know, is you want to find lung cancer early enough to have the chance to cure it. Once lung cancer is metastatic, you can buy time, but it's very unusual to cure a patient, whereas in early-stage lung cancer, particularly if no lymph nodes are involved, you have actually a pretty good shot at curing patients. So, the National Lung Screening Trial looked at around 53,000 patients, randomly allocated them to chest X-ray versus low-dose CT. Previously, there had been studies that showed that annual chest X-ray is valueless or close to valueless in screening for early lung cancer. And they looked both at the number of lung cancer deaths per 100,000 person years, and the number of lung cancers that they found per 100,000, and they found a significant, both clinically significant and statistically significant, difference in favor of low dose. There was a second big, randomized trial, run by the Dutch and Belgians, and it was called the Nelson trial. They had a smaller group, and that was only around 13,000, and they compared low-dose CAT scanning versus no screening at all, and once again, found a statistically significant and clinically relevant difference in cancer deaths and the numbers of cancers found.

The downside was there was the risk of false positive results, in other words, a lump seen on either chest X-ray or CAT scan is not necessarily cancer, and that's always been the issue in the past of worrying people. But the big deal here is that they were able to save lives by finding early lung cancers by using low-dose CT scanning. The only other thing to mention is this phrase, "low-dose CT scanning," relates to the amount of X-ray or radiation exposure that patients might suffer from having repeat CT scans. So, the recent technology that has been developed internationally has the amount of radiation brought down to a low level, therefore reducing the risk of potentially causing any type of malignancy.

Dr. Sands:

Those are such wonderful points. I think a lot of people kind of forget that the NLST did show a significant all-cause mortality benefit.. Thank you for outlining that. Now if we kind of switch gears and talk about the underserved population that you're addressing and their lack of access to this test, can you kind of outline the problem there or the scenario?

Dr. Raghavan:

Well, throughout the USA and in countries that have nationalized medicine, there are many populations that just don't get good access to care. It will be sometimes immigrant populations because they're fearful or they don't speak the language. In this country at the present time, with ICE being very active still, many of the immigrant populations are afraid that they might be picked up and exported. The Black community is undereducated in some cases on health care. There were a number of unfortunate experiments done in the last century that have left the Black community, or some parts of the Black community, suspicious of health care, the so-called "Tuskegee Experiments" being an example. And then you have groups that are geographically isolated. One of the biggest populations that has trouble is those that are financially challenged. In the state of North Carolina, until relatively recently, Medicaid – which is for people who are at the lowest end of the financial scale – Medicaid would not reimburse for lung cancer screening. Oddly enough, Medicare would do so, and as it turns out, the elderly were essentially covered financially for getting lung screens done. Remember that the traditional model has CT scanners based in office environments or hospital environments. That can make it particularly difficult for rural populations, and it actually selects against the Black community and some of the immigrant communities, where there simply isn't the density of office populations or hospital populations, and fear and suspicion of hospital-based medicine. Given that scenario, the problem that has come up is that if you look at the National Lung Screening Trial, which was an excellent trial, only less than 5% of their population were Black American. Now that's a huge underrepresentation, and from my memory, they actually didn't define the Hispanic/Latinx population involved, and they didn't define that they were covering Native Americans.

And again, the Native American communities are often geographically isolated from health care resources. So, basically, while this was a breakthrough in terms of finding early lung cancer, it was excluding some of the most high-risk people, particularly in the underserved communities that have such a tendency, both to smoke a lot and still to be targeted by the cigarette companies, so that you've kind of got a perfect storm working against underserved communities.

Dr. Sands:

That's such an important point about the lack of inclusion of minority communities in many studies. And to that point, Dr. Lori Pierce, the president of ASCO, highlighted during a prior interview, data showing that minority communities are interested in participating in trials, but often are less likely to be offered access. So let's dive into your research on mobile CT screening that you presented at ASCO. We'll start with an overview of the study itself.

Dr. Raghavan:

It's pretty much exactly framed as you suggested, Jacob. We're a safety net center in North Carolina, so we've had extensive screening and education programs for the Black community—a lot of that work being done through Black churches and various outreach programs. We've done work with beautician and barber shops—and the Hispanic community, and there we again have worked with churches, we've developed breast cancer educational programs that are focused in living room sessions and in churches. So we really were sitting around thinking about what had we missed out on. We have prostate cancer screening programs, actually restricted to the Black community, because they have high risk. And we realized that we weren't doing anything much for lung cancer, and I said to my team, "Just get me a mobile CT scanner." I was aware of the Cleveland Clinic's mobile head scanning unit. I used to run the cancer center there some years ago, and I thought that was a cool idea. Well, when we went to the various manufacturers, they explained to us that there were no mobile CAT scanning units available. They were too big and too heavy for mobile units. We said, "Okay, well, would you make us one?" And several of the companies said no. Samsung said, "Yeah, we'll do it if you pay for it." And so we got a grant from the Bristol Myers Squibb 501c3 foundation, a supporting grant from the Leon Levine Foundation, which is a local foundation in Charlotte, and we basically had them build a heavy duty vehicle that had a cabin in it, a low-dose CAT scanner, some equipment that would allow us to teleport the images to a central review position, and then we created some other bits that allowed us to educate patients while we were there. And so, we basically created a mobile unit that could go pretty much off-road.

Dr. Sands:

For those just tuning in, you're listening to *Project Oncology* on ReachMD. I'm Dr. Jacob Sands, and I'm speaking with Dr. Derek Raghavan about lung screening for high-risk patients within underserved communities. You've discussed the benefits of screening, the access issue, and your project. Let's get into some of the study results that you presented at ASCO. What did you find and was there anything that surprised you?

Dr. Raghavan:

There were a number of surprises. Just to tell you what we did, we looked at 1,200 heavy smokers. Now, as I mentioned, we're in North Carolina, which is part of the smoking belt, so our mean pack-year use was 47. The highest pack-year history that we had was 189, and that wasn't a typographical error. That was a guy who smoked four packs of cigarettes a day—four—for about 40 years, plus. So anyway, we had a mean pack-year history of 47, which was actually much higher than the National Lung Screening Trial and the Belgian study. About 51 percent of our patients were men. The average age was 60, and the range was 55 to 66. I mentioned as we were

talking a few moments ago, that Medicare in this state covered screening, and we were actually looking to people who couldn't get access, and that's why the cutoff was at 66. As you know Jacob, the cutoff for Medicare is 64. We found a small number of patients who, for one reason or another, were not eligible for Medicare and so we screened them. They were in the 65 to 66 year old age group. But we basically selected against ourselves, because the Medicare population have the highest incidence of lung cancer. All of our patients were either uninsured, or had Medicaid, which didn't cover screening, or were underinsured and would not be able to afford the copays. 78 percent of them were rural, 22 percent urban, and we had just under 18 percent who were African American, which exceeds our demographic. Our Hispanic/Latinx population was 2.3 percent, which is a little low, but most of the early part of this work was done when President Trump was really pushing ICE to be exploring very closely the Hispanic population, and so they were frightened. And then we had a small population—0.5 percent of Native Americans. And so, that basically took us to the point where we found, actually 30 lung cancers among the 1,200 people that we screened.

And what was surprising to me was two things. One is we found a bunch of patients who were treated with curative intent. There was not a difference in curative intent outcome for the African Americans versus the Caucasians that we saw. We actually had some patients with lymph node positive disease, who remained clear of cancer beyond three years. Now, for an indigent and underserved population, it is extremely unusual to see them with early-stage disease. They tend to seek medical care when they have symptoms, and those symptoms are generally associated with pretty advanced disease. So, the first surprise to me was the fact that we actually found, a bunch of patients that were treated with curative intent. I don't honestly believe that they will all be cured, but we're still doing a whole lot better than one might have expected if one waited until they presented to the emergency department.

Then the second thing that I thought was surprising was the fact that this population of people who normally do not like this type of intervention and tend not to come back for things like repeat mammograms and so on, we had a very substantial group who actually attended for repeated scans. It ran at 55 percent, and so that was surprising because conventional wisdom is that this is a population that does not cooperate, but in fact, these people did. And then the other thing that was kind of interesting was we found a bunch of other cancers incidentally. So when you're doing a whole-body CAT scan, you actually find other tumor types. We found a couple of pancreas cancers, two kidney cancers, and a nasopharyngeal cancer.

One of the things that I think is quite important, and a takeaway, although many people think it's cool to do screening activities for the underserved and then say, "Well, okay, we found an early cancer. now go and get treatment." We made the commitment to these folks, understanding that most of them were uninsured, that if we found something we would take care of it. And so, we offered treatment. There was some interesting papers at the annual meeting of ASCO that showed that underserved populations generally have long lag times to getting treatment, because they have to find physicians who will look after them. That was not an issue for us. And so, we were able to get prompt treatment to these folks.

Dr. Sands:

I love that you started with that commitment. That's so important. Now let's look toward the future. What do you think are the next steps to the research, as far as the effectiveness of the mobile scanner?

Dr. Raghavan:

I'd say that there's been a lot of interest in the primary care, internal medicine, pulmonology, medical oncology community, and so several people have reached out and have indicated that they'd like to work with us and we think that's a great idea. We now have two, what we call "lung buses," in operation and we're collaborating with other hospital systems here in North Carolina, South Carolina and Georgia. The thing that slows us down is just getting regulatory approval to actually do the screening tests. I've been toying with the idea about doing a randomized trial of hospital-based versus mobile screening to kind of prove that this is the way to go. And the reason for thinking about that is we have 1,200 cases. I wrote notes to the editors of two major general medical journals and said, "I've got a new approach to this thing. It will really be a game-changer potentially, in early populations, and they both said, "Yeah, this is only descriptive work. You don't have any genes being studied, and you haven't got a randomized element, so we're really not interested." And I just thought that was kind of sad, and so we may well do some sort of randomized trial.

In parallel, one of the other things that we've learned is while conventional wisdom is that underserved populations don't like to be involved in research, as you quoted Lori Pierce saying accurately, if you actually talk to them, engage their community leaders, and you provide services to them, they're more than happy to be involved in research. And so we're going to be looking, as we have such a prominence of minority populations, we're going to be starting to look at differential gene expression in the different populations, looking to see whether we should be using different targeted agents, whether they're predictors of outcome for long-term survival, and so on. And so, it'll be a mix of community implementation, expansion to other underserved populations.

I'll comment that one of the other things we've done with the mobile unit is started to reach out to Native American communities in this area, involving the tribal elders so that they're engaged in it. We have a very interesting set of studies going on at the moment, with

more than 1,000 first responder firefighters, who are consistently exposed to a bunch of toxins that are potentially carcinogenic, so we're really trying to leverage this work with the intention of finding early lung cancers and treating them. My friend, Otis Brawley, who used to be the chief medical officer of the American Cancer Society, once said, "If you could give the survival of a college-educated, white male, in the USA, to everyone with cancer, you'd bring the death rate from cancer down by 30-50%." And I think there's probably a lot of truth in that statement.

Dr. Sands:

Well, this research certainly provides a hopeful outlook on lung screening access, particularly for underserved populations. I want to thank my guest, Dr. Derek Raghavan, for joining me to discuss his insights and research in lung screening. Dr. Raghavan, absolute pleasure having you on the program today.

Dr. Raghavan:

The pleasure was mine. Nice talking to you, Dr. Sands.

Dr. Sands:

I'm Dr. Jacob Sands. To access this and other episodes in our series, visit ReachMD.com/ProjectOncology, where you can Be Part of the Knowledge. Thanks for listening.